

CERTIFIED FOR PUBLICATION

IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA
FIRST APPELLATE DISTRICT
DIVISION THREE

THE PEOPLE,

Plaintiff and Respondent,

v.

WILLIAM CURTIS WILSON,

Defendant and Appellant.

A101459

(Solano County
Super. Ct. No. FCR182521)

Forensic DNA testing yields a genetic profile. When the profile of a suspect matches the profile derived from crime scene evidence, the statistical significance of the match is estimated by calculating the probability of finding the profile in a randomly selected member of the population of possible suspects. (Nat. Resource Council, *The Evaluation of Forensic DNA Evidence* (1996), hereafter “1996 NRC Report,” p. 127; *People v. Soto* (1999) 21 Cal.4th 512, 522-523.) Profile frequencies within the major racial groups in the United States (Caucasian, African American, Hispanic, East Asian, and Native American) vary to such an extent that separate DNA databases are maintained for the purpose of providing accurate estimates of profile frequency.¹ (1996 NRC Report, pp. 28, 57-58, 98, 151; see also *People v. Soto*, *supra*, 21 Cal.4th at p. 526, fn. 18.) The case before us raises a question concerning which of these databases should be consulted when calculating the random match probability.

¹ The genetic differences of the races should not be overemphasized — there is more variation among individuals of the same race than there is, on average, among racial groups. This is why DNA testing is such a powerful identification tool. (1996 NRC Report, pp. 94-96, 151-153.)

Appellant William Curtis Wilson contends a preliminary showing of the perpetrator's race is needed to establish the relevant population database for calculating a DNA profile frequency. A DNA expert testified that Wilson's genetic profile, which matched crime scene evidence, would be expected to occur in 1 of 96 billion Caucasians, 1 of 180 billion Hispanics, and 1 of 340 billion African-Americans. Defense counsel objected to this testimony on the ground that evidence of the perpetrator's racial background was required to lay a foundation for the profile frequency evidence. The trial court overruled the objection.

Wilson claims the court erred. He relies on *People v. Pizarro* (1992) 10 Cal.App.4th 57 (*Pizarro I*), disapproved on another point in *People v. Venegas* (1998) 18 Cal.4th 47, 78, and its successor, *People v. Pizarro* (2003) 110 Cal.App.4th 530 (*Pizarro II*). The analysis in the *Pizarro* cases supports Wilson's arguments. Our colleagues in the Fifth District held that the relevance of evidence showing the frequency of a DNA profile in a particular racial group depends on a preliminary factual showing that the perpetrator belongs to that group.² (*Pizarro I, supra*, 10 Cal.App.4th at p. 94; *Pizarro II, supra*, 110 Cal.App.4th at p. 627-631.)

We respectfully disagree with the *Pizarro* court's reasoning. The relevant group for determining random-match probabilities is the *population of possible suspects*, not the perpetrator's population. (1996 NRC Report, p. 127; see also *id.* at p. 122, Recommendation 4.1, and *People v. Soto, supra*, 21 Cal.4th at pp. 518 and 532, fn. 27.) The purpose of determining profile frequencies is to assess the rarity of the matched profile in the population from which the evidence sample *may* have come, which is frequently a much broader population than the perpetrator's racial group.

Furthermore, even under the *Pizarro* analysis Wilson's objection was meritless. His conviction must be affirmed.

² The *Pizarro* court used the terms "ethnicity" and "ethnic group." We follow the usage of the 1996 NRC Report, and use "race" and "racial group" to refer to the major groups in the United States population for which separate DNA databases are kept. (1996 NRC Report, p. 57.)

BACKGROUND

At about 6:15 p.m. on April 6, 2000, the body of 13-year-old Sarah P. was discovered on the living room floor of her Vacaville home by her mother and sister. She had been strangled with a telephone cord. Her pants and panties had been removed, and her shirt was pushed up. There were multiple bruises, scrapes, and scratches on her body.

Wilson was acquainted with Sarah and her family; he had visited the house regularly while dating Sarah's older sister three years earlier. After his arrest, in an interview with a newspaper reporter, Wilson said he had received a page from his girlfriend shortly after 5:00 in Beelard Park on the day of the murder. He had walked to Sarah's house on Isabella Drive to ask to use the telephone. He said Sarah had greeted him at the door and given him a hug. When she said she was home alone, he asked her to give him the phone outside, because he knew there was a "house rule" about being inside alone with Sarah. Wilson said he made his call and returned to the park.

Jennifer Cargo testified that around 3:00 the same afternoon, Wilson crudely propositioned her at her apartment complex in Vacaville. They knew each other from high school. Wilson asked if she lived with anyone. Cargo told him (falsely) that she lived with her boyfriend, then went into her apartment and locked the door. She saw no scratches on Wilson's face.

Shortly after 4:30 the same afternoon, Heather Cain was walking her dog in Beelard Park.³ Wilson walked up to her, asked for her name and phone number, and said he wanted to get to know her better. Cain said she had a boyfriend and kept walking. Further along in the park, Wilson approached Cain again and repeated his queries, making suggestive remarks and complimenting her appearance. He walked alongside Cain, repeating similar remarks, until she emerged from the park onto a city street and loudly said she did not understand why he wasn't going away. At that point, Wilson crossed to the other side of the street and told her she didn't understand, he loved her.

³ Cain was sure about the time, because she always walked her dog at 4:30 and an alarm was set for that time.

The last time Cain saw Wilson, he was walking down Isabella Drive. When she got home five minutes later, it was 4:58. She saw no scratches or scrapes on Wilson during their encounter.

Wilson's girlfriend Sabrina Espinoza testified that she had paged Wilson shortly after 5:00. He returned the call around 15 minutes later, saying he was at a friend's house. Espinoza could hear a girl laughing in the background. Espinoza and Wilson spoke for about five minutes.

Another Vacaville resident claimed she met Wilson around the same time as Cain. Marcia Bergland testified that she found Wilson in her garage at about 4:30.⁴ He had severe scratches on his face, his eyes were "kinda glassy," and he was "kinda sweaty." She asked why he was there. Wilson said he was selling newspaper subscriptions. Bergland told him to leave, but he stayed and asked if she was married. She said yes, and Wilson inquired if her husband was home. Bergland asked if he wanted her to get her husband, and again told Wilson to leave. He did not, so she walked down her driveway and motioned for a friend to come over. Wilson came out of the garage and told Bergland she was beautiful. As her friend was driving toward them, Wilson walked away.

At about 6:00, Wilson visited his friend Sandra Galvan at her house, in the neighborhood where Sarah lived. Wilson showed her some scratches on his neck and said he had been in a fight. As they were watching television, Wilson told Galvan he had done something bad. Galvan advised him to "fix it," but he said he could not.

The police identified Wilson as a suspect some time after 9:00 that evening, after Marcia Bergland contacted them. He was arrested as he walked down a street around 2:00 a.m. He had fresh scratches on the back of his neck, his right shoulder, both forearms, his chest, his chin, and under his right eye. Three kinds of DNA tests (D1S80,

⁴ Bergland said she was sure about the time, because it was her daughter's birthday and a father was late picking up his child from Bergland's day-care service that day. He came at 4:15 instead of 3:30, and stayed and talked for ten or fifteen minutes. Bergland then telephoned her daughter and noticed it was 4:30 when she hung up just before going to the garage.

DQA1 polymarker, and STR) were performed on bloodstains found on Sarah's and Wilson's clothing. All of them matched Wilson's profile to blood on Sarah's jeans, and Sarah's profile to blood on Wilson's pants. The STR testing also matched Sarah to a hair found in Wilson's pants, and both Sarah and Wilson to blood found under Sarah's fingernail.

The STR test was the most sensitive, comparing nine genetic markers and including a marker for gender determination. Nicola Shea, a criminalist with the California Department of Justice's Sacramento laboratory, was the prosecution's STR expert. Shea testified that the Department followed the statistical approach recommended by the 1996 NRC Report for presenting the frequency with which genetic profiles occur, in order to give juries an understanding of the significance of a DNA match. The Department used databases published by the Federal Bureau of Investigation in the Journal of Forensic Sciences reflecting profile frequencies in the Caucasian, Hispanic, and African-American populations, "because those are the major populations in our country and in our state."

All three databases were used to avoid making assumptions about the ethnic background of the perpetrator. Data for other groups, such as Native Americans, would also be compared if there were information indicating another group might be a source of the evidence sample. Shea explained that "the same profile will show up with a different frequency in the different populations." However, when nine genetic markers are used in the analysis, the result would be a "pretty discriminating number" no matter what population database was used.

Wilson's genetic profile would be expected to occur in 1 of 96 billion Caucasians, 1 of 180 billion Hispanics, and 1 of 340 billion African-Americans. Sarah's genetic profile would be expected to occur in 1 of 110 trillion Hispanics, 1 of 140 trillion Caucasians, and 1 of 610 trillion African-Americans. Shea noted that these profiles were extremely rare; the worldwide human population is only six and a half to seven billion.

Wilson objected to the introduction of the profile frequencies, contending the prosecution had failed to lay a foundation for this evidence because the race of the

perpetrator who left the samples at the crime scene was not established. Wilson argued that without such a showing, the databases Shea used were irrelevant.⁵ The trial court rejected these claims.

The jury convicted Wilson of first degree murder with use of a dangerous weapon during commission of an attempted rape and a lewd act upon a child. The court sentenced him to a term of life in prison without possibility of parole.

DISCUSSION

Wilson raises only one issue on appeal. He contends the trial court erred by failing to exclude Shea's testimony on the frequency of the genetic profiles, based on arguments developed in *Pizarro I* and *Pizarro II*.

1. *The Pizarro Decisions*

The *Pizarro* appeals arose from Pizarro's prosecution for the murder and rape of his 13-year-old half-sister. The victim and Pizarro's wife had gone looking for Pizarro in the middle of the night as he walked home from a party, where he had been drinking heavily. When they found him, some time after 1:00 a.m., the victim approached him. He ran into a brushy area, followed by the victim. Pizarro's wife shouted for them to turn on the flashlight the victim was carrying or say something to let her know they were all right. She saw a flash of light, then heard a scream and a muffled sound. Frightened, she returned to her mother-in-law's house. Pizarro appeared at the house alone around 5:50 a.m. The victim's body was discovered later that morning after Pizarro told the police where to look. She had been beaten and suffocated. There were foxtails in her hair, fist, and hairband, and on the inside and outside of Pizarro's shorts and underwear. Pizarro testified that he suffered blackouts after drinking excessively. He told an investigator that alcohol made him violent. (*Pizarro I*, *supra*, 10 Cal.App.4th at pp. 61-65; *Pizarro II*, *supra*, 110 Cal.App.4th at pp. 549-553.)

⁵ At the time of trial, in October 2002, *Pizarro I* was available to defense counsel, as well as an early version of *Pizarro II*, which had been withdrawn by a grant of rehearing. (*People v. Pizarro* (Aug 7, 2002, F030754), rehearing granted Sep. 6, 2002.)

DNA testing matched Pizarro's profile to the profile derived from semen on vaginal swabs taken from the victim. An FBI expert testified that the probability of finding another unrelated Hispanic individual with a similar profile was around 1 in 250,000. The chances of finding a matching profile in the Caucasian population was 1 in 10 million. Pizarro was half Hispanic and half Caucasian. The expert explained that the only available comparison in such a situation was to both ethnic populations. The FBI would then use the statistics most favorable to the defendant in an attempt to be as conservative as possible; in this case, the Hispanic frequency favored Pizarro. (*Pizarro I, supra*, 10 Cal.App.4th at p. 64; *Pizarro II, supra*, 110 Cal.App.4th at pp. 623-625.)

In *Pizarro I*, the court decided the prosecution had failed to establish general acceptance in the scientific community of either the testing procedures employed by the FBI or the viability of the database it used for its statistical comparisons. (*Pizarro I, supra*, 10 Cal.App.4th at pp. 79-80, 89.) The court reversed Pizarro's conviction and remanded for a thorough *Kelly* hearing on these issues (*People v. Kelly* (1976) 17 Cal.3d 24), with instructions to reinstate the conviction if the trial court concluded the evidence met the standard for admissibility. (*Pizarro I, supra*, 10 Cal.App.4th at p. 95.)

Wilson's arguments on this appeal originate in comments included in *Pizarro I* for the benefit of the trial court on remand. The *Pizarro I* court was troubled by the FBI's selection of databases based on the *suspect's* racial background, when the *perpetrator's* background was the relevant consideration. (*Pizarro I, supra*, 10 Cal.App.4th at pp. 90, 92.) Reasoning that the perpetrator's background is the preliminary fact on which the relevance of the statistical probability evidence depends, the court declared: "Absent proof sufficient under Evidence Code section 403 to support the preliminary fact as to the racial/ethnic background of the perpetrator, we see no relevancy to a data base selected because of the racial/ethnic background of the suspect/defendant." (*Pizarro I, supra*, 10 Cal.App.4th at p. 94.) The court suggested using a general population database to avoid this problem, noting that the National Research Council's 1992 report on DNA forensic technology suggested using such a database with calculations employing a "ceiling

principle” for determining profile frequencies without regard to race or ethnicity.

However, the court refrained from endorsing this approach.⁶ (*Ibid.*)

Pizarro’s *Kelly* hearing after remand was held in 1998. The trial court found the evidence admissible and reinstated the conviction. The *Pizarro II* court reversed. (*Pizarro II*, *supra*, 110 Cal.App.4th at p. 540.) It held the FBI had employed an improper scientific procedure to discern the perpetrator’s genetic profile in a mixed sample of DNA from both the perpetrator and the victim, and improperly referred to Pizarro’s genotype to prove the perpetrator’s genotype in the sample. (*Id.* at pp. 547, 621.) The court further held the Hispanic profile frequency provided by the FBI expert was not relevant to prove the rarity of the perpetrator’s profile unless there was sufficient evidence to establish the preliminary fact that the perpetrator was Hispanic. The court declined to decide whether the evidence of the perpetrator’s ethnicity was sufficient, but ruled that the prosecutor had improperly relied on Pizarro’s ethnicity to establish the perpetrator’s ethnicity. (*Id.* at pp. 547-548, 623.)

Here, we are concerned only with the second holding in *Pizarro II*, which Wilson claims requires the reversal of his conviction. The Attorney General agrees that *Pizarro II* supports Wilson’s position, but contends it was wrongly decided.

The *Pizarro II* court began its analysis of the profile frequency issue from the position taken in *Pizarro I* — “the relevance of the Hispanic profile frequency depended

⁶ The 1996 NRC Report agreed with critics of the ceiling principle who found it arbitrary, unscientific, and excessively conservative. (The ceiling principle proposed in the 1992 report was never used because the necessary database was not compiled, but an “interim ceiling principle” was implemented, with controversial results.) (1996 NRC Report at pp. 156-158.) “The abundance of data in different ethnic groups within the major races and the genetically and statistically sound methods recommended in this report imply that both the ceiling principle and the interim ceiling principle are unnecessary.” (*Id.* at p. 162.)

In *People v. Soto*, *supra*, our Supreme Court held that profile frequency calculations performed on the results of VNTR typing without using a ceiling principle had achieved general acceptance in the scientific community and thus were admissible in evidence. (*Id.*, 21 Cal.4th at pp. 540-541.) In *People v. Reeves* (2001) 91 Cal.App.4th 14, this court reached the same conclusion with respect to STR test results like those obtained in Wilson’s case. (*Id.* at pp. 38-42.)

on the preliminary fact that the perpetrator was Hispanic.” (*Pizarro II, supra*, 110 Cal.App.4th at p. 627.) By informing the jury that the relevant database was that for the Hispanic population, the prosecution had “communicated its assumption that [Pizarro] was the perpetrator and effectively instructed the jury to presume that because [Pizarro] was Hispanic, the perpetrator was also Hispanic. This communication potentially lightened the prosecution’s burden of proving [Pizarro’s] identity as the perpetrator.” (*Id.* at p. 628.)

The Attorney General in *Pizarro II* claimed the profile frequency statistics for a defendant’s ethnic group were relevant to help the jury assess the rarity of the profile. The court rejected this claim, noting it depended on the assumption that the perpetrator belonged to the defendant’s group, and observing “the jury is not assisted by knowing how many Hispanics possess the perpetrator’s traits if the perpetrator is actually Asian.” (*Pizarro II, supra*, 110 Cal.App.4th at p. 628.) The Attorney General also argued that the frequency statistics merely placed the defendant in the class of possible perpetrators. The court disagreed, noting it was the match evidence that includes a defendant within that class. (*Id.* at pp. 628-629.) “The match includes the defendant in the class; the frequency calculation estimates the size of that class so that membership in it has meaning. The fewer the members, the more incriminating the membership.” (*Id.* at p. 629.)

The Attorney General pointed out that a defendant typically benefits from a profile frequency calculated using a database from his own ethnic group, as in this case, where the FBI expert relied on the Hispanic frequency because it was more favorable to Pizarro than the Caucasian frequency. The court responded that without sufficient evidence of the perpetrator’s ethnicity, “the Hispanic frequency simply was not relevant; no amount of potential or actual numerical benefit to [Pizarro] could transform this irrelevant inadmissible evidence into relevant admissible evidence.” (*Pizarro II, supra*, 110 Cal.App.4th at p. 631.)

On rehearing in *Pizarro II*, the Attorney General advocated the presentation of a range of ethnic frequencies. The court acknowledged that this approach was suggested in the 1996 NRC Report, but noted it was not followed in Pizarro’s case. (*Pizarro II, supra*,

110 Cal.App.4th at p. 631; see 1996 NRC Report p. 122.) The court identified three problems with presenting a range of ethnic frequencies: (1) without evidence of the perpetrator's ethnicity, any particular ethnic frequency was irrelevant; (2) mentioning ethnicity improperly encourages jurors to focus on the ethnicity and race of the defendant; and (3) a range extending from the most rare to the least rare frequency tends to prejudice the defendant by encouraging the jurors to focus on the most damaging figure. (*Id.* at pp. 631-633.)

The *Pizarro II* court suggested three solutions to the problems posed by profile frequency statistics: (1) presentation of the most conservative frequency, without any mention of ethnicity; (2) presentation of a single frequency calculated from a general, nonethnic database, if such an option is scientifically valid; and (3) proof that the perpetrator more likely than not belongs to a particular ethnic population, and presentation of the profile frequency in that population. (*Pizarro II*, *supra*, 110 Cal.App.4th at p. 633, fn. 85; see *People v. Marshall* (1996) 13 Cal.4th 799, 832-833 [preponderance standard applies to proof of preliminary fact under Evid. Code § 403].)

2. *Wilson's Case*

The case before us differs from *Pizarro's* in one critical respect — there is no suggestion in the record that the databases used by the DNA expert for calculating profile frequencies were chosen based on Wilson's or Sarah's racial background. Witnesses described Wilson as a light-skinned black man. The police report described Sarah as white. Shea testified that she followed a standard practice of determining the frequency of the matched profiles using Caucasian, Hispanic, and African-American databases, in order to avoid making assumptions about the ethnic background of the perpetrator or the victim. (Shea misspoke in reference to the "victim," whose ethnic identity was known; it was the ethnicity of the person who left the bloodstains and the hair on Wilson's pants, which matched Sarah's profile, that was in question.) Nevertheless, the *Pizarro* court's

critique of database evidence on grounds of relevance and lack of foundation casts doubt on the admissibility of Shea's testimony.⁷

We believe the *Pizarro* court's insistence that the database used to calculate the profile frequency must be drawn from the perpetrator's racial group was misplaced. The random-match probability is meant to measure the rarity of the genetic profile detected in the evidence sample and in the defendant by estimating the frequency with which it occurs in the population of *possible suspects*. As explained in the 1996 NRC Report:

"Suppose that a DNA sample from a crime scene and one from a suspect are compared, and the two profiles match at every locus tested. Either the suspect left the DNA or someone else did. We want to evaluate the probability of finding this profile in the 'someone else' case. That person is assumed to be a random member of the population of possible suspects. So we calculate the frequency of the profile in the most relevant population or populations. The frequency can be called the random-match probability, and it can be regarded as an estimate of the answer to the question: What is the probability that a person *other than the suspect*, randomly selected from the population, will have this profile? The smaller that probability, the greater the likelihood that the two DNA samples came from the same person." (1996 NRC Report, p. 127, italics added.)

The population of possible suspects frequently includes a range of "potential perpetrators," whose numbers and race depend on what is known about the circumstances of the crime. When the perpetrator's race is unknown, the frequencies with which the

⁷ Our concurring colleague describes the *Pizarro II* court's discussion of relevance as mere dicta. We disagree. The court began its analysis of the database issue by stating its holding on the relevance of database evidence, and it repeatedly and emphatically restated that position throughout the discussion. The court's resolution of the database issue was based squarely on its ruling that the Hispanic database was irrelevant. (*Pizarro II*, *supra*, 110 Cal.App.4th at pp. 627-633.)

matched profile occurs in various racial groups to which the perpetrator *might* belong are relevant for the purpose of ascertaining the rarity of the profile. ⁸

The *Pizarro II* court may have been misled by comments in the 1996 NRC Report suggesting that using a database from the “wrong” racial group leads to errors in the profile frequency calculation. (*Pizarro II*, *supra*, 110 Cal.App.4th at p. 627, fn. 76, quoting the 1996 NRC Report at p. 34; see also p. 151 of the report.) However, the report’s references to “wrong” databases were based on the assumption that the race of the profiled person is known. While the race of the defendant is known, the purpose of calculating the random match probability in a criminal prosecution is to assess the rarity of the profile in *other* possible suspects. Absent reliable information limiting the population of possible suspects to persons of a certain race, multiple databases must be consulted for that purpose. The resulting range of random match probabilities includes no errors of the kind contemplated by the authors of the 1996 NRC Report in the passages noted above. If a profile is calculated to occur in 1 of a million whites, 1 of 5 million African-Americans, and 1 of 10 million Hispanics, all those numbers are accurate estimates of the probability of a random match within each racial group.

We note that the *Pizarro* court, when suggesting solutions to the problem posed by the differences in profile frequencies among racial groups, implicitly abandoned its position that profile frequency evidence is irrelevant without evidence of the perpetrator’s race. The court approved the “presentation of the one most conservative profile frequency, without mention of ethnicity” in cases where the perpetrator’s ethnicity is not

⁸ “In the great majority of cases, very little is known about the person who left the DNA evidence It might be known that the DNA came from a white person, in which case the white database is appropriate. If the race is not known or if the population is of racially mixed ancestry, the calculations can be made with each of the appropriate databases and these presented to the court.” (1996 NRC Report, pp. 113-114; see also Recommendation 4.1 at p. 122, and *People v. Soto*, *supra*, 21 Cal.4th at pp. 518, 532, fn. 27.)

It is not always easy to say when the race of the perpetrator is “known.” For instance, in *People v. Soto*, *supra*, a rape victim described her attacker as a white man with light hair. Soto, a neighbor of the victim who was ultimately convicted based at least partly on DNA evidence, was Hispanic with a dark complexion and black hair. (21 Cal.4th at p. 517.)

established. (*Pizarro II*, *supra*, 110 Cal.App.4th at p. 633, fn. 85.) Clearly, however, if that frequency were calculated from an irrelevant database, simply failing to mention the group from which the database was drawn would not remedy the defect.⁹

We also observe that even if a showing of the perpetrator's race were required for the admission of profile frequency evidence, neither Pizarro nor Wilson would have had a meritorious objection to the relevance of the evidence offered at their trials. In both cases, there was abundant circumstantial evidence that the defendant and the perpetrator came from the same racial group (and indeed, inhabited the same skin). Pizarro was not merely the last person seen with the victim. It was also shown that his wife heard a scream and a muffled sound after the victim followed Pizarro into a brushy area; that he was able to direct the police to the location of the victim's body the next morning; and most incriminating of all, that foxtails were found on both the victim and the outside *and inside* of Pizarro's clothing, including his underwear. (*Id.* at pp. 550-552.)

Wilson aggressively propositioned several women before the assault on Sarah, showing interest in whether they lived alone; he admitted speaking with Sarah around the time of the killing when she was alone at her home, where the murder occurred; he was seen by witnesses in the area before the killing, without scratches, and after the killing, with scratches consistent with the struggle indicated by the crime scene evidence; and shortly after the murder he told a witness he had done something bad, which he could not "fix."

Even if these circumstances were deemed insufficient to establish by a preponderance of the evidence that the perpetrators belonged to the defendants' racial

⁹ We do not mean to suggest there is anything wrong with this alternative approach; we dispute only the notion that any database not drawn from the perpetrator's racial group is irrelevant. Indeed, we find much to recommend in the idea of presenting only the most conservative random match probability to the jury. As the *Pizarro II* court noted, this alternative could be adopted without misrepresenting the DNA evidence by informing the jury that the profile is found in no more than 1 in however many million persons — "that the profile is at least this rare." (*Pizarro II*, *supra*, 110 Cal.App.4th at p. 633, fn. 85.) The merits of that alternative are not before us, however.

groups, the additional fact that the defendants' DNA profiles matched the crime scene evidence would provide all the foundation necessary for admission of the profile frequencies in their groups, under the reasoning of *Pizarro II*. Since both defendants had racially mixed ancestry, the presentation of profile frequencies for the racial groups that contributed to their genotypes would have been proper.¹⁰ (See 1996 NRC Report, p. 114.) Thus, while we disagree with the *Pizarro* court's analysis, even if it were followed it would not have helped Wilson.

Wilson's objections to the DNA match evidence were meritless, and the trial court properly rejected them.

DISPOSITION

The judgment is affirmed.

Parrilli, J.

I concur:

Corrigan, Acting P. J.

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¹⁰ Although Wilson's attorney suggested, indirectly, that his client might have Native American ancestry, no evidence of this was presented. There was also no evidence of Wilson's ancestry other than witness testimony that he was a "light-skinned black man." However, he raised no objection on this point.

POLLAK, J., concurring.

I agree with the lead opinion that evidence of the genetic profile frequencies of the most common racial groups in the general population is relevant and should be admissible when there is a match between the genetic profile of the defendant's DNA and of DNA obtained from the crime scene, and there is no preliminary showing of the perpetrator's race. I write separately to emphasize that our disagreement with *People v. Pizarro* (2003) 110 Cal.App.4th 530 (*Pizarro II*) is not with what I take to be a holding in that case, but with its dicta.

In *Pizarro II* the court addressed two issues relating to the use of DNA evidence. First, the court held that the prosecution's expert had used improper methodology to determine the match between the genetic profile of the defendant and of the perpetrator. The crime scene DNA was a mixed sample of DNA from both the perpetrator and the victim. In extracting the perpetrator's genotype from the mixed sample, the court held among other things that the expert had unjustifiably assumed that the perpetrator's genotype was the same as the defendant's. The propriety of particular matching techniques, in a mixed sample or otherwise, is not presented in this case and the lead opinion does not address that subject. Certainly we do not suggest any disagreement with the general proposition that the perpetrator's genotype should be determined independently of the defendant's genotype. (110 Cal.App.4th at pp. 547, 565-576, 589-601.)

The second broad issue considered in *Pizarro II* related to the proper database to be used in determining the frequency of the perpetrator's genetic profile once a match with the defendant's profile has been established and there is no independent evidence to establish the perpetrator's race. The defendant in *Pizarro II* was of mixed Hispanic and Caucasian ethnicity, and the prosecution presented evidence of the DNA profile frequency of only Hispanics and Caucasians. (110 Cal.App.4th at p. 631, fn. 81.) The Court of Appeal held that it was error to "present[] the Hispanic frequency because *defendant* was Hispanic. . . . [T]rial testimony regarding which database to choose when 'someone is half Hispanic and half Caucasian' plainly referred to defendant. The

prosecution *informed* the jury that the relevant population was Hispanic and that the Hispanic database was chosen based on defendant's ethnicity. The prosecution thus communicated its assumption that defendant was the perpetrator and effectively instructed the jury to presume that because defendant was Hispanic, the perpetrator was also Hispanic. This communication potentially lightened the prosecution's burden of proving defendant's identity as the perpetrator. Furthermore, if there was insufficient independent proof to establish the perpetrator's Hispanic ethnicity, reliance on defendant's ethnicity added an unproved trait to the perpetrator's description, and served as inadequate foundation for the Hispanic frequency, which was irrelevant and inadmissible. [¶] . . . The calculation *assumes* the perpetrator, like the defendant, is Hispanic; but if the perpetrator is not, the frequency is irrelevant and does not assist the jury in any way." (*Id.* at p. 628, fns. omitted.)

That is not what occurred in this case. Here, the prosecution presented evidence of the frequency of defendant's genetic profile among the three major racial groups in the population. The prosecution expert testified, "When we present the statistical data in our cases, we present the data for the Caucasian, Hispanic and African-American population, because those are the major populations in our country and in our state." The expert acknowledged that the frequencies for additional ethnic groups would differ, but pointed out that having used nine genetic markers to establish the match, the likelihood of finding another individual with the same profile would be very small in any population. "[T]he three populations given give you a ballpark of how often you would expect to see that profile in [other] populations." Thus, the evidence presented to the jury concerning the probability of finding another person whose genetic profile matches the DNA from the crime scene did not, as in *Pizarro II*, imply that the perpetrator was necessarily of defendant's race. In upholding the admissibility of the evidence in this case, we do not approve of limiting the database to the race of the defendant, as the trial court did in *Pizarro II*.

Where we differ with *Pizarro II* is in its dicta. After disapproving of reliance on a database selected to correspond to the race of the defendant, the Court of Appeal went on

to consider alternative approaches that would be acceptable when the perpetrator's race is unknown. In a lengthy footnote the *Pizarro II* court described three alternatives that it considered acceptable. (110 Cal.App.4th at pp. 633-634, fn. 85.) One of these "is presentation of a single frequency calculated from a general, nonethnic database. . . . [T]his method makes no assumptions regarding the perpetrator's ethnicity and promotes no unwarranted ethnic or racial considerations." (*Id.* at p. 633, fn. 85.) However, as the footnote goes on to imply and as the record in the present case tends to confirm, this method may not be "scientifically valid" and may "result[] in a frequency that is not considered conservative" so that "it is not a viable option." (*Ibid.*) Nonetheless, the alternative method used in the present case—"presentation of several frequencies derived from various ethnic databases" (*id.* at p. 631)—was rejected by the *Pizarro II* court. It is with that rejection that we disagree.

Although *Pizarro II* acknowledged that "presentation of a range of ethnic frequencies may in fact accurately provide the range of all possible frequencies" (110 Cal.App.4th at p. 631), it disapproved of such testimony for three reasons. First, the court reasoned that "in the absence of sufficient evidence of the perpetrator's ethnicity, *any* particular ethnic frequency is irrelevant." (*Id.* at p. 632.) While that proposition may be correct with respect to evidence of the frequency for a single ethnicity, or even for several random ethnicities, it is not true if those ethnic groups represent the largest proportion of the population and the evidence shows that the order of magnitude is similar for other racial groups. The evidence is received to show the *likelihood* that another individual possesses the same genetic characteristics as the DNA found at the crime scene. If the odds are infinitesimal for a sizable majority of the population, evidence of that fact has a tendency in reason to prove that the DNA came from the defendant, even if smaller segments of the population were not included in calculating those percentages and the odds are not conclusive. (Evid. Code, § 210.) Moreover, although the exact percentages were presented for only the three largest racial groups, the testimony that the percentages for other racial groups would be similarly small gives relevance to the numbers presented without making any assumptions as to the perpetrator's race.

The *Pizarro II* court's second objection to the presentation of genetic frequencies for separate racial groupings was that "improper mention of ethnicity unfairly and unjustifiably encourages the jurors to focus on ethnicity and race—specifically the ethnicity and race of the defendant, the only suspect before them." (110 Cal.App.4th at p. 632.) While we are in complete agreement with the importance of excluding racial stereotypes and prejudices from the courtroom, this rationale provides no justification for excluding evidence of objectively established physical differences among racial populations when such differences are relevant to the issues being tried. In order to determine the significance of the match between defendant's DNA and the crime scene DNA, it is necessary—and relevant—to establish the likelihood that the crime scene DNA came from another person. There is agreement within the scientific community that genetic frequencies differ for different racial or ethnic populations, and that frequency data would be less accurate without such differentiation. By presenting the data for the major racial components of the population, when there is no independent evidence of the perpetrator's race, the prosecution presents the data necessary for the jury to evaluate the likelihood that the crime scene DNA came from someone other than the defendant. Presenting the objective data in the manner in which such information is collected and analyzed within the scientific community does not inject inappropriate racial assumptions or issues into the litigation. To the contrary, in presenting data for the most numerous racial groups in the population, the focus is removed from the race of the defendant.

Finally, *Pizarro II* objected to evidence of several ethnic frequencies because "the jury hears unjustifiably damaging evidence because the various ethnic frequencies create a range extending from the most conservative and beneficial to the defendant to the most rare and damning to the defendant." (110 Cal.App.4th at p. 632.) The court assumed that if the jury hears a range of frequencies, it will "likely focus on" the lowest frequency most damaging to the defendant. We see no reason to make such an assumption. The fact of the matter is that when there is no independent evidence of the perpetrator's race, the chances that the crime scene DNA matches that of another individual varies for individuals of different races. There is no reason to underestimate the jury's intelligence

and to assume that when told the different frequencies the jury will not appreciate this element of uncertainty and factor it into its assessment of the weight that should be given to the evidence. Moreover, as the science underlying DNA comparisons continues to improve, the practical significance of the different racial frequencies diminishes. In *Pizarro II* the court was concerned that the jury might focus on a 1 in 10 million frequency for Hispanics when the frequency for Caucasians was only 1 in 1 million and the frequency for Blacks was only 1 in 2.5 million. Whatever the likelihood may be that such a spread would have any appreciable effect on the weight a jury ascribes to evidence of the match with the defendant's DNA, the probabilities in the present case are of a different order of magnitude. Because the STR test compared nine genetic markers, the likelihood of a match ranged from 1 in 96 billion for Caucasians to 1 in 340 billion for African-Americans. Since there are no more than 7 billion people on the planet, it is rather unlikely, to say the very least, that a jury's evaluation of the significance of the match between defendant's DNA and the crime scene DNA would differ whether the jury focuses on 1 in 96 billion, 1 in 340 billion, or any number in between, as the likelihood of a random match with another person.

Thus, there is no cogent reason to preclude testimony of a range of ethnic or racial genetic profile frequencies when the race of the perpetrator is unknown, so long as the data is not presented in a manner that assumes that the race of the perpetrator is the same as the race of the defendant.¹ Since the testimony in the present case made no such assumption, it was relevant, nonprejudicial, and properly received, the dicta in *Pizarro II* notwithstanding.

Pollak, J.

¹ This is not to say that if and when use of a single composite database becomes scientifically acceptable (see, e.g., Nat. Com. on the Future of DNA Evidence, *The Future of Forensic DNA Testing: Predictions of the Research and Development Working Group* (Nov. 2000) pp. 5, 27), it may not be preferable to utilize such a database. Nor do I suggest any disagreement with the observations in footnote 9 of the majority opinion concerning the alternative approach of utilizing the database with the most conservative profile frequency without mentioning ethnicity.

Trial Court:

Solano County Superior Court

Trial Judge:

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